Tanji River Bird Reserve, The Gambia—a globally important breeding site for Royal Tern *Thalasseus maximus*

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La Réserve d'oiseaux de Tanji, Gambie—un site de nidification mondialement important pour la Sterne royale *Sterna maxima*. La Réserve d'oiseaux de Tanji en Gambie abrite un nombre important d'oiseaux de mer nicheurs. Les auteurs présentent les résultats d'un suivi mensuel sur une période de huit ans ; des données plus anciennes sont également fournies. Pendant cette période les nombres de Sternes royales *Thalasseus maximus* et caspiennes *Hydroprogne caspia* ont fortement augmenté. Le nombre moyen de nids sur les huit ans est de 21.505 pour la Sterne royale et 1.688 pour la Sterne caspienne. Compte tenu de la période d'incubation moyenne de ces deux espèces et de nos inventaires mensuels, le nombre de nids donne une indication approximative du nombre de couples. La colonie de Sternes royales sur l'île Tanji est apparemment la deuxième plus grande en Afrique. La Réserve d'oiseaux de Tanji, qui abrite jusqu'à 19% de la population nicheuse de l'Afrique de l'Ouest, est ainsi un site de nidification mondialement important pour l'espèce.

Summary. Tanji River Bird Reserve in The Gambia holds important numbers of breeding seabirds. Monthly monitoring over an eight-year period is reported, together with earlier data. During this time substantial increases of Royal Tern *Thalasseus maximus* and Caspian Tern *Hydroprogne caspia* have been recorded. The mean number of nests over the eight years is 21,505 for Royal and 1,688 for Caspian Tern. Given the mean incubation period of these two species and our monthly survey visits, the number of nests provides an approximate index of the number of pairs, making the Royal Tern colony on Tanji Island the second largest in Africa. Tanji Bird Reserve is thus a globally important breeding site for the species, holding up to 19% of the West African breeding population.

The Bijol Islands and the mouth of the Tanji River are the most important sites for gulls and terns in The Gambia and constitute an Important Bird Area (BirdLife International 2011). Foremost amongst these are two islets that lie 2 km offshore (13°23'N 16°48'W) opposite the towns of Brufut and Tanji. In 1993 the Bijol Islands were gazetted and became known as the Tanji River (Karinti) Bird Reserve. The birds of the Bijol Islands were described by Barnett *et al.* (2001), Veen (2003) and Veen *et al.* (2003, 2004). Since then bird monitoring by the Department of Parks and Wildlife Management (DPWM) has been regular and systematic counts of breeding seabirds have been undertaken annually, but surprisingly little has been published on the recent status of breeding seabirds there. This paper reports the systematic monthly counts of breeding seabirds over an eight-year period and focuses on the number of breeding Royal Terns *Thalasseus maximus*.

Site description

The two tiny, low-lying and unstable islands are accumulations of sand, trapped by laterite reefs. They were formerly lightly wooded, but disappeared in the 1960s and have gradually reformed since then. The larger island (6,665 m^2 in 2011) is now partially vegetated by the creeping halophytes *Ipomoea pes-caprae* and *Sesuvium portulacastrum* (Barnett *et al.* 2001). The islands are connected by a ridge of reef at low tide. The smaller island (850 m^2 in 2011) has the remains of a lighthouse but no vegetation. There is one tree *c.*6 m in height and two bushes 1–2 m tall on the larger island. The tern colony is sited on the exposed sand, mostly on the island's middle-southern edge, between the high-tide line and the edge of the vegetation, where the beach is more stabilised and sheltered from the Atlantic Ocean (Fig. 1). Other birds, e.g. gulls, breed amongst the vegetation in the centre in the island. The entire area is vulnerable to emersion and change in severe weather.

Regular breeding species in Tanji River Bird Reserve include Royal Tern, Caspian Tern *Hydroprogne caspia*, Grey-headed Gull *Chroicocephalus cirrocephalus* and Slender-billed Gull *C. genei*. A few pairs of Long-tailed Cormorants *Microcarbo africanus* and Western

Figure 1. Royal Tern *Thalasseus maximus* and Caspian Tern *Hydroprogne caspia* colony, Tanji River Bird Reserve, Gambia, April 2012 (Donald Shields)

Colonie de Sternes royales *Thalasseus maximus* et de Sternes caspiennes *Hydroprogne caspia*, Réserve d'oiseaux de Tanji, Gambie, avril 2012 (Donald Shields)

Reef Heron *Egretta gularis* nest on the tree and bushes, and Pink-backed Pelicans *Pelecanus rufescens* formally bred but no longer do so.

Survey methods

Between 2003–10, the Bijol Islands were systematically surveyed throughout the year. Breeding bird surveys were spaced approximately one calendar month apart (although this was not always possible due to adverse weather conditions), as the mean incubation period for the main breeding species is usually < 30 days (e.g. Grey-headed Gull 22–26 days; Slender-billed Gull 22–28 days; Caspian Tern 26–28 days; Royal Tern 30–31 days: Cramp & Simmons 1983). This permits monthly counts of nests to be cumulatively added, to provide an index of annual totals of breeding attempts and apparent numbers of pairs. It should be noted that annual counts were undertaken by different observers and although they followed a standard survey method, observer variability may have influenced the data collected.

It is recognised that annual breeding attempts may not be directly transposed into breeding pairs, as some pairs may be double-counted if they fail and then re-lay. It is also possible that some birds will lay eggs just after one survey visit and hatch before the next, and thus be missed. The opposite may also occur if birds lay eggs that are incubated longer than 30 days, hatching after the second visit and therefore double-counted. However, it is highly unlikely that this was an important source of error as the maximum incubation period of Royal Tern is 31 days and counts are spaced one month apart. Although the proportion of early and late hatchers in the population is unknown, it has been assumed for the purpose of population estimates that these are roughly equal and therefore cancel each other out. Future work is planned to test this assumption.

Surveys are conducted in two ways. Early in the season all nests containing eggs are located by walking and counting each nest and the number of eggs contained therein. If a nest has a chick and eggs then these are also counted. Nests

Table 1. Number of Royal Tern *Thalasseus maximus* nests recorded during monthly surveys on Bijol Islands, Gambia, 2003–10.

Tableau 1. Nombre de nids de la Sterne royale *Thalasseus maximus* recensés pendant les inventaires mensuels sur les îles Bijol, Gambie, 2003–10.

Year	March	April	May	June	July	August
2003	0	25	12,871	3,500*	0	0
2004	0	No data	15,375	0**	0	0
2005	0	10,500***	8,809	230	0	0
2006	0	22,855	565	371	0	0
2007	0	6,561	25,515	16	0	0
2008	0	5,372	12,096	0	0	0
2009	0	13,202	7,350	70	0	0
2010	0	10,000	16,356	397	0	0

*Possibly repeat clutches following high tide.
**High tide after May count washed away all nests.
***Estimated count due to bad weather disrupting surveys.

Table 2. Number of Caspian Tern *Hydroprogne caspia* nests recorded during monthly surveys on Bijol Islands, Gambia, 2003–10.

Tableau 2. Nombre de nids de la Sterne caspienne *Hydroprogne caspia* recensés pendant les inventaires mensuels sur les îles Bijol, Gambie, 2003–10.

Year	January	February	March	April	May	June
2003	N/D*	N/D*	N/D*	72	26	31
2004	N/D*	251	199	N/D*	141	0
2005	N/D*	N/D*	300	N/D*	208	0
2006	0	208	737	14	0	0
2007	0	213	1,086	325	101	34
2008	308	1,232	427	308	101	0
2009	178	2,163	532	166	6	0
2010	442	1,323	1,485	503	382	0

N/D* = No data collected.

containing only chicks or chicks already out of the nest are not counted. Each team consists of two people, one examining the nests and the other recording the details. This method is used for Caspian Terns, Grey-headed Gulls and Slender-billed Gulls, as these nests are at relatively low density and the spacing of nests permits easy and safe access to the colony.

Royal Terns are monitored differently due to the large numbers and density of the nests. A minimum of ten random 1 m^2 quadrat squares are established in the colony and all of the eggs within the quadrats are counted, with the mean number of nests per quadrat then calculated. The total area of the nesting colony is estimated in square metres (using marker pegs and a tape measure) and multiplied by the mean number of nests per 1 m^2 in the quadrats to produce an estimate for the entire colony. Occasionally, poor weather during visits has hampered surveys.

Survey results

Royal Terns breed on the Bijol Islands in April–June each year, with peak nesting activity in April–May (Table 1). Caspian Terns breed on the Bijol Islands during any of the first six months of the year, with peak activity usually in February–March (Table 2).

The annual number of Royal and Caspian Tern nests varies, but they have shown a general increase during the monitoring period (Fig. 2). The mean number of Royal Tern nests over the eight-year period is 21,505 and the mean number of Caspian Tern nests 1,688, although the latter is probably an underestimate because the 2003–05 data were based on partial counts.

Discussion

The numbers of breeding seabirds on the Bijol Islands have been occasionally reported since 2000, when at least 7,360 Royal Tern nests / pairs and 150 Caspian Tern nests / pairs were recorded (Barnett *et al.* 2001). In 2001, the Royal Tern colony had increased by >1,000 pairs to 8,500 pairs (L. Barnett & C. Emms *in Bull. ABC* 9: 9). There has been a substantial increase in the number of nests / pairs of both species since then, although it should be noted that Royal Tern numbers show large annual fluctuations (Fig. 2).

It is unclear to what extent regular boat patrols by the DPWM have contributed to this rise in nesting terns because egg collecting has occasionally occurred. Terns are known to switch colonies between years, but it is unlikely that birds from the nearest colony at Île aux Oiseaux in Senegal (13°37'36"N 16°38'21"W) have moved as there is no evidence of a decrease in numbers at this site (JV pers. obs.). Thus, increasing numbers probably result from successful breeding and / or birds relocating from other colonies further afield.

Royal Tern is not globally threatened (being categorised by the IUCN as Least Concern), but declines have been reported in several areas in the Americas (Gochfeld & Burger 1996). The species has a very large world range and occurs in the Americas and on the Atlantic coast of Africa,

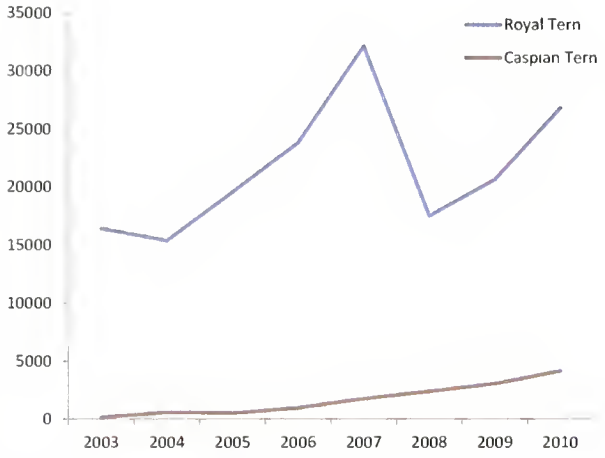

Figure 2. Annual number of Royal Tern *Thalasseus maximus* and Caspian Tern *Hydroprogne caspia* nests on the Bijol Islands, Gambia, 2003–10 (note that data include some partial counts, when bad weather disrupted surveys).

Nombre annuel de nids de Sternes royales *Thalasseus maximus* et de Sternes caspiennes *Hydroprogne caspia* sur les îles Bijol, Gambie, 2003–10 (noter que les données comprennent quelques dénombrements partiels, quand le mauvais temps a perturbé les inventaires).

where it breeds from Mauritania (Banc d'Arguin) to Guinea. There are two subspecies, American *maximus* and West African *albididorsalis*. The world population is estimated to be 375,000 mature individuals; the West African subspecies is estimated at 225,000 individuals (Wetlands International 2006). In 2003–06 JV checked 14 West African colonies and numbers of breeding Royal Terns always exceeded 1,000 breeding pairs and in 11 cases more than 10,000 pairs (with those colonies on the Banc d'Arguin sited on different islands treated as one).

Historically the largest colony has been the 43,000 nests on Île aux Oiseaux in the Saloum Delta, Senegal, in 1999 (Veen *et al.* 2003). Taking the mean Bijol Islands annual count, the 21,505 Royal Tern pairs would not only be the second-largest colony in Africa, but with an assumed 43,010 mature individuals, Tanji Bird Reserve holds at least 19% of the West African Royal Tern population.

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